TITLE: EFFECT OF RATES OF NITRAPYRIN AND NITROGEN FERTILIZER ON YIELD AND CHEMICAL COMPOSITION OF BURLEY TOBACCO LEAF AND SMOKE

AUTHORS: J. L. Sims* and J. L. Hamilton; and J. F. Chaplin

AFFILIATION: Department of Agronomy and USDA, University of Kentucky, Lexington, KY 40546; and USDA, Tobacco Research Laboratory, Oxford, NC 27565

ABSTRACT: Field experiments were conducted during 1979-80 at Lexington, KY, on Maury soil to determine the effects of rates of nitrapyrin [2-chloro-6-(trichloromethyl)-pyridine] and N fertilizer on the chemical composition of burley tobacco (Nicotiana tabacum L. cv Ky-14). In Experiment 1, nitrapyrin from 0 to 8.96 kg active ingredient/ha was applied on N fertilizer and broadcast and incorporated immediately into the surface layer of soil. The N fertilizer was applied uniformly at 280 kg N/ha. In Experiment 2, N from 0 to 336 kg N/ha was applied broadcast with and without nitrapyrin (1.12 kg/ha). Plants were sampled 50 days after transplanting, at harvest, and after curing for chemical analysis. Results for Experiment 1 indicated nitrapyrin had negligible effects on growth and yield of tobacco at rates of 1.12 kg/ha and below, but decreased yields at higher rates of nitrapyrin. Generally, concentrations of total N, protein N, total alkaloids, and TVNB-N of leaf, and total particulate matter (dry), nicotine, and tar of all-burley cigarettes were increased by increasing rates of nitrapyrin. In contrast, in leaves the concentration of nicotine N was decreased and the concentrations of mineral elements were unaffected by increasing rates of nitrapyrin. In Experiment 2, growth, cured leaf yields, and concentrations of total N, protein N, nitrate N, and total alkaloids were all greater in the presence than absence of nitrapyrin. The effect of nitrapyrin was greater at low than high rates of N fertilizer.

REVIEW: Field experiments were conducted using two fields, on Maury soil, to determine the effects of rates of nitrapyrin and N-fertilizer on the chemical composition of burley tobacco. The functions of nitrapyrin [2-chloro-6-(trichloromethyl)-pyridine] are to stop the pH change of the soil, and to delay nitrification for 30-60 days by stopping the function of nitrosomones.

$$2NH_4^+ + 3O_2 \rightarrow 2NO_2^- + 2H_2O + 4H^+$$

X nitrosomones

$$2NO_2^- + O_2 \rightarrow 2O_3^-$$

In Experiment 1, nitrapyrin was applied with constant N-fertilizer as described in the abstract. The N-fertilizers used were $Ca(NO_3)_2$, $NH_4NO_3$ and urea. Results indicated that nitrapyrin had negligible effects on growth and yield at rates of 1.12 kg/ha or below, but decreased yields at higher rates of nitrapyrin. Due to higher $NH_4^+$ nutrition, the leaves looked wrinkled. Higher nitrapyrin rates also reduced the Mn content in the plant.

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